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ABSTRACT:

A sliding-vane machine, which may be a pneumatic motor, has a rotor (16) and a stator body (19) encircling the rotor and abutting a pair of check plates (12, 17) whose inner faces are coated with a wear-resistant material. On at least one of the check plates said coating is constituted by an adhesive-attached foil e.g. copper gauze covered with P.T.F.E. on its side next the stator and the rotor, Fig. 2 (not shown). <IMAGE>

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(54) Rotary Positive-displacement Fluid-machines

(57) A sliding-vane machine, which may be a pneumatic motor, has a rotor (16) and a stator body (19) encircling the rotor and abutting a pair of check plates (12, 17) whose inner faces are coated with a wear-resistant material. On at least one of the check plates said coating is constituted by an adhesive-attached foil e.g. copper gauze covered with P.T.F.E. on its side next the stator and the rotor, Fig. 2 (not shown).

FIG.1

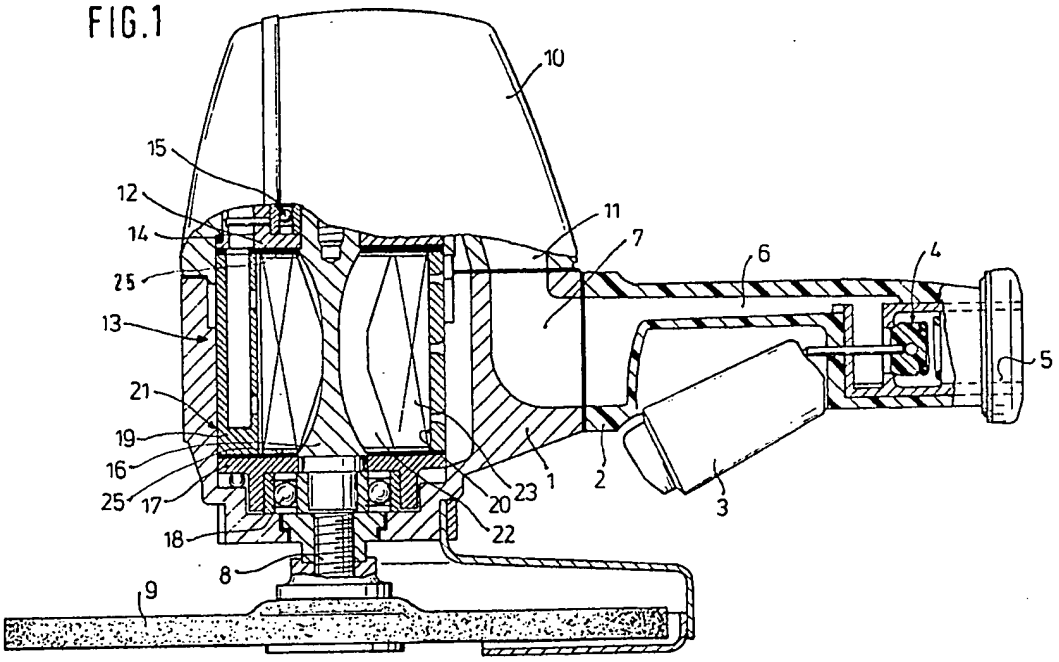

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FIG. 2

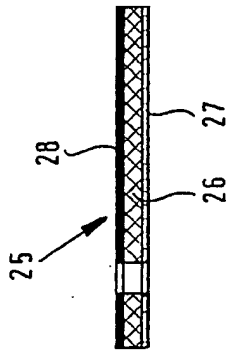

FIG. 1

SPECIFICATION

Vane-type Rotating Machine

The invention relates to a vane-type rotating machine of the kind having a rotor, and a stator which is formed by a hollow body surrounding the working chamber of the rotor, and by two plates which are mounted on the end faces of the hollow body and in which the rotor is journalled and whose side faces, axially delimiting the working chamber, carry a coating of foreign material which is more wear-resistant than the basic metal of the flanges and which forms with the material of the rotor and of the rotor vanes a pairing having a low coefficient of friction.

A machine of this kind is already known in which the cylindrical contact surface of the rotor is coated with plastics material (USA Patent Specification No. 3,190,183). Wear-resistant discs are provided at both sides of the vanes of the rotor and are mounted as individual parts on the rotor or are clamped between the cylindrical hollow body of the stator and the associated flange. Although these discs can be changed as parts subject to wear, they occasion increased costs during assembly of the unit.

Furthermore, a vane-type machine is known in which the cylindrical contact surface and also the two planar end faces, formed on the flanges, of the working chamber in the stator are coated with molybdenum (German Offenlegungsschrift No. 27 52 233). However, this material is relatively expensive and requires finishing by grinding. When the molybdenum coating has been subjected to a considerable amount of wear, the part of the stator which carries the coating has to be changed in its entirety.

There is provided by the present invention a vane-type rotating machine, particularly a compressed-air motor, having a rotor, and stator which is formed by a hollow body surrounding the working chamber of the rotor, and by two plates which are mounted on the end faces of the hollow body and in which the rotor is journalled and whose side faces, axially delimiting the working chamber, carry a coating of foreign material which is more wear-resistant than the basic metal of the flanges and which forms with material of the rotor and of the rotor vanes a pairing having a low coefficient of friction, wherein at least one plate carries a glued-on foil whose side face facing the rotor has the required friction properties.

In contrast to the known machine, the machine in accordance with the invention has the advantage that the wear-resistant surfaces on the flanges of the stator can be formed by inexpensive parts which can be readily connected to the flanges in manufacture and which do not complicate the assembly of the machine and do not require finishing work. The foil can be removed from the flange in the event of wear or damage, and further use can be made of the flange after a fresh foil has been glued thereto. When the foil is being glued to the flange, the foil can already be provided with the cut-away portions required for air inlet and outlets ports and for rotor journals, locating pin and the like and, with appropriate arrangement of these cut-away portions and appropriate construction of the foil, foils of identical construction can be used for both the bearing flanges.

Preferably, the foil comprises a copper gauze to which a copper coating having the required properties is undetachably applied. Tests have shown that foils comprising sheet steel coated with anti-friction lacquer, or a suitable sheet metal made from e.g. copper and beryllium, can be used with satisfactory results. Polytetrafluoroethylene has proved to be advantageous for coating the main metal body of the foil.

The glueing of the foil to the flanges can be further simplified if the adhesive coating is a component part of the foil.

Advantageously, the cylindrical contact surface of the stator can be provided in a known manner with a molybdenum coating applied by the plasma spray method.

An embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:—

Figure 1 shows a compressed-air grinder provided with a drive machine constructed in accordance with the invention, and

Figure 2 shows part of Figure 1, drawn to an enlarged scale.

The illustrated grinder has a metal motor housing 1 on the side of which are mounted two plastics handles 2 only one of which handles is shown. A trigger switch 3 is disposed in the handle and acts upon valve 4. The end of the handle is provided with a screw connection 5 by means of which the handle can be connected to a compressed-air line. An air passage 6 in the handle leads from the valve 4 to the motor housing where the passage 6 continues in the form of a passage 7.

A grinding disc 9 is secured to a grinding spindle 8 which extends out of the bottom of the motor housing 1. A governor housing 10 of hood-like construction is mounted on the top of the motor housing 1. The passage 7 in the motor housing continues in the form of a passage 11 in the governor housing. The governor housing accommodates a centrifugal governor (not illustrated) and an upper bearing plate 12, made from light metal, of a vane-type motor 13. An O-ring 14 seals the upper bearing plate. The rotor 16 of the vane-type motor 13 is journalled in a roller bearing 15 accommodated in the upper bearing plate 12.

A lower bearing plate 17 made from light metal is disposed in the region of the bottom end of the motor housing 1 and accommodates a roller bearing 18. The grinding spindle 8 is integrally formed with the rotor 16 and is journalled in the roller bearing 18. A substantially cylindrical hollow body 19, also made from light metal, is clamped between the upper bearing

plate 12 and the lower bearing plate 17 and has an eccentric bore 20. The hollow body 19 and the bearing plates 12 and 17 together form the stator 21 of the vane-type motor 13 within which the rotor 16 rotates. The vanes 23, which are made from plastics material, and which are carried in slots 22 in the rotor 16, run sealingly against the bore 20 in the hollow body 19.

When running, the vanes 23 are pressed against the wall of the bore 20 in the hollow body 19 by centrifugal force. This wall is coated with molybdenum.

Those end faces of the two bearing plates 12 and 17 which face the rotor 16 are provided with glued-on foil 25 which, as shown in Figure 2, has a copper gauze 26 serving as a main body to one side of which is applied a plastics coating 27 and whose other side carries an adhesive coating 28. The plastics coating 27 is formed from polytetrafluoroethylene or some other wear-resistant, low-friction plastics material which has higher wear-resistance than the basic metal of the bearing plate and which, together with the material of the abutting vanes 23 and the material of the rotor 16, forms a pairing which is distinguished by particularly good anti-friction properties. The illustrated foil is already provided with the cut-away portions for the air inlets and outlets and for stator locating pins and the like and is applied to the bearing plates by known manufacturing aids such that the cut-away portions in the foil and in the bearing plate are in register. There is no need to finish the surface of the foil or the cut-away portions therein after the adhesive coating has set. A worn or damaged foil can be removed from the bearing plate in a simple manner and the bearing plate can continue to be used after a fresh foil has been glued thereto. The plastics material used on the foil renders it unnecessary to add lubricant to the compressed air for operating the machine.

Claims

1. Vane-type rotating machine, particularly a compressed-air motor, having a rotor, and a stator which is formed by a hollow body surrounding the working chamber of the rotor, and by two plates which are mounted in the end faces of the hollow body and in which the rotor is journalled and whose side faces, axially delimiting the working chamber, carry a coating of foreign material which is more wear-resistant than the basic metal of the flanges and which forms with the material of the rotor and of the rotor vanes a pairing having a low coefficient of friction, wherein at least one plate carries a glued-on foil whose side face facing the rotor has the required friction properties.

2. Machine as claimed in claim 1, wherein the foil has a copper gauze serving as a carrying main body to which a plastics coating having the required properties is unreleasably applied.

3. Machine as claimed in claim 1, wherein the foil comprises a sheet steel which is coated with an anti-friction lacquer.

4. Machine as claimed in claim 3, wherein the sheet steel is hardened.

5. Machine as claimed in claim 1, wherein the foil comprises a sheet metal of wear-resistant and low-friction properties.

6. Machine as claimed in claim 5, wherein the sheet metal is copper or beryllium.

7. Machine as claimed in any of the preceding claims, wherein that side of the foil which is remote from the wear-resistant coating has an adhesive coating as a component part thereof.

8. Machine as claimed in any of the preceding claims, wherein the contact surface of the hollow body surrounding the working chamber is provided with a coating of molybdenum applied preferably by the plasma spray method.

9. A vane-type rotating machine substantially as hereinbefore described with reference to the accompanying drawings.

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